

**What is claimed is:**

- 5 1. A method of bonding an upper substrate and a lower substrate in order to manufacture a plastic micro chip comprising the upper substrate, the lower substrate and a sample filling space having a predetermined height for filling a sample between the upper and lower substrates, wherein the upper and lower substrates are bonded by introducing an organic solvent between the upper and lower substrates.
- 10 2. A method of manufacturing a plastic micro chip comprising an upper substrate, a lower substrate and a sample filling space having a predetermined height for filling a sample between the upper and lower substrates, comprising steps of:
- 15 (a) forming a fine channel space for filling a bonding organic solvent in a bonding region of a circumference of the sample filling space; and
- (b) overlapping the upper and lower substrates each other, and then introducing the organic solvent into the fine channel to bond the upper and lower substrates.
- 20 3. The method according to claim 2, further comprising a step of forming one or more holes for introducing the organic solvent communicating with the fine channel when the fine channel is formed in the step of (a).

4. The method according to claim 2, further comprising a step of performing a corona or plasma treatment for the bonding area so that the organic solvent subsequently introduced smoothly flows and a bonding strength is increased, after forming the fine channel.
5. The method according to claim 2, wherein the fine channel has a height of 100  $\mu\text{m}$  or less.
6. The method according to claim 2, wherein the step of (b) further comprises a sub-step of pressurizing or decompressing the fine channel after introducing the organic solvent into the fine channel.
7. The method according to claim 1 or 2, wherein the organic solvent is at least one selected from a group consisting of ketone, aromatic hydrocarbon, cyanoacrylate compound and halogenated hydrocarbon.
8. The method according to claim 7, wherein the organic solvent is at least one selected from a group consisting of acetone, chloroform, methylene chloride, ethylcyanoacrylate and carbon tetrachloride.
9. The method according to claim 1 or 2, wherein the upper and lower substrates are made of polycarbonate, polystyrene, polypropylene, polyethylene derivatives or polymethylmethacrylate.

10. A plastic micro chip comprising:

an upper substrate, a lower substrate, a sample filling space having a predetermined height for filling a sample between the upper and lower substrates, and a fine channel defining a space for filling an organic solvent so as to bond the upper and lower substrates in a bonding region of a circumference of the sample filling space of the upper substrate.

11. The plastic micro chip according to claim 10, further comprising one or more holes for introducing the organic solvent communicating with the fine channel.

12. The plastic micro chip according to claim 10, wherein the organic solvent is at least one selected from a group consisting of ketone, aromatic hydrocarbon, cyanoacrylate compound and halogenated hydrocarbon.

13. The plastic micro chip according to claim 12, wherein the organic solvent is at least one selected from a group consisting of acetone, chloroform, methylene chloride, ethylcyanoacrylate and carbon tetrachloride.

14. The plastic micro chip according to claim 10, wherein the fine channel has a height of 100  $\mu\text{m}$  or less.

15. The plastic micro chip according to claim 10, wherein the bonding region is transparent.
- 5 16. The plastic micro chip according to claim 10, wherein the upper and lower substrates are made of polycarbonate, polystyrene, polypropylene, polyethylene derivatives, polymethylmethacrylate or acryl-based plastic material.